AUGMENTED AND/OR VIRTUAL REALITY FOOTWEAR

CROSS REFERENCE TO RELATED APPLICATION

This application is a Non-Provisional of, and claims priority to, U.S. Provisional Application No. 62/503,543, filed on May 9, 2017, the disclosure of which is incorporated by reference herein in its entirety.

FIELD

This document relates, generally, to movement in an augmented and/or a virtual reality system.

BACKGROUND

An augmented reality (AR) and/or virtual reality (VR) system may generate a three-dimensional (3D) immersive environment. A user may experience this 3D immersive virtual environment through interaction with various electronic devices, such as, for example, a helmet or other head mounted device including a display, glasses or goggles that a user looks through when viewing a display device, gloves fitted with sensors, external handheld devices that include sensors, and other such devices. Once immersed in the virtual environment, the user may move through the virtual environment, and may interact with objects and features in the virtual environment using various different input methods. Physical boundaries of and/or physical obstacles in the physical environment in which the system is operated may affect a user's ability to move or interact within the physical environment while immersed in the virtual environment.

SUMMARY

In one aspect, a motorized shoe assembly may include a platform; a flex region provided on a bottom surface portion of the platform, the platform being configured to flex at the flex region through a range of flexure, between a neutral state and a fully flexed state; and a locomotion device coupled to the bottom surface portion of the platform. The locomotion device may include a plurality of wheels; and at least one belt coupled to the plurality of wheels, the plurality of wheels configured to guide movement of the at least one belt. The motorized shoe assembly may also include a motor coupled to the platform and selectively providing power to the locomotion device to selectively operate the locomotion device; and a linkage assembly coupled to the bottom surface portion of the platform, and coupled to the locomotion device, the linkage assembly being configured to maintain a target amount of tension on the at least one belt through the range of flexure of the platform.

In another aspect, a method may include tracking a physical position of at least one motorized shoe in a physical environment; detecting a distance between the at least one motorized shoe and a physical boundary of a physical operational zone defined in the physical environment; comparing the detected distance to a threshold distance; actuating a locomotion device of the at least one motorized shoe in response to a detection of the at least one motorized shoe within the threshold distance to the physical boundary of the physical operational zone when the detected distance is less than or equal to the threshold distance based on the comparison; and moving the at least one motorized shoe into a physical return zone defined within the physical operational zone in response to actuation of the locomotion device to maintain a physical position of the at least one motorized shoe within the physical operational zone.

In another aspect, a motorized shoe assembly may include motorized shoe assembly may include a platform; a motor; a locomotion device coupled to the platform; a power transmission device coupling the motor and the locomotion device; and a processing device operably coupling the motorized shoe assembly with an external computing device. The processing device may include a tracking device that is trackable by the external computing device for tracking a physical position of the motorized shoe assembly; a processor; and a non-transitory computer-readable storage medium. The non-transitory computer-readable storage medium may store instructions that, when executed, cause the processor to detect a distance between the motorized shoe assembly and a physical boundary of a physical operational zone defined in a physical environment that is less than or equal to a threshold distance; actuate the motor in response to the detection of the motorized shoe assembly within the threshold distance to the boundary of the operational zone; and move the motorized shoe assembly in toward a physical return zone defined within the physical operational zone in response to actuation of the motor to maintain a position of the motorized shoe within the physical operational zone.

The details of one or more implementations are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an example implementation of an augmented and/or virtual reality system.

FIGS. **2**A-**2**B illustrate operation of an example augmented and/or virtual reality system, in accordance with implementations described herein.

FIGS. **3**A-**3**C illustrate operation of an example augmented and/or virtual reality system, in accordance with implementations described herein.

FIGS. **4**A-**4**B illustrate an exemplary stride of a user.

FIGS. **5**A-**5**C illustrate an example motorized footwear component of an example augmented and/or virtual reality system, in accordance with implementations described herein.

FIGS. **6**A-**6**D illustrate example locomotion devices of the example motorized footwear component shown in FIGS. **5**A-**5**C, in accordance with implementations described herein.

FIGS. **7**A-**7**D illustrate example power transmission devices of the example motorized footwear component shown in FIGS. **5**A-**5**C, in accordance with implementations described herein.

FIGS. **8**-**10** illustrate example motorized footwear components of an example augmented and/or virtual reality system, in accordance with implementations described herein.

FIG. **11** illustrates an example motorized footwear assembly, in accordance with implementations described herein.

FIGS. **12**A-**12**D illustrate neutral and flexed states of the example motorized footwear assembly shown in FIG. **11**, in accordance with implementations described herein.

FIGS. **13**A-**13**B are perspective views of an example head mounted display device, in accordance with implementations described herein.